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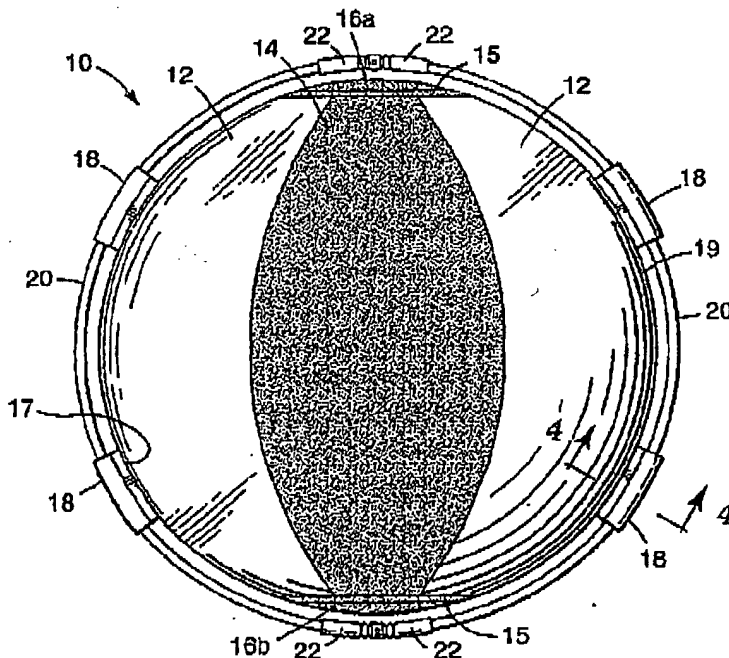
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(57) Abstract

Illuminated game balls and balloons are provided. The game balls and balloons have means for holding thereon at least one chemiluminescent light stick proximate the surface of thereof. The chemiluminescent light stick(s) may be held proximate the surface of the game balls by loops, tabs or grooves on the surface of the game balls, while the chemiluminescent light stick(s) may be held on the surface of the balloons by loops.



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## ILLUMINATED GAME BALLS AND BALLOONS

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### FIELD OF THE INVENTION

The present invention relates to various game balls, either inflated or self-supporting, and balloons illuminated utilizing chemiluminescent light sticks.

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### BACKGROUND OF THE INVENTION

Various means have been suggested for illuminating game balls and the like. Suggested means have included light and battery mechanisms, generally with switches, while other articles have utilized chemiluminescent light sticks in various configurations.

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In some disclosed configurations, a duct, shaft or passage is formed on a central axis of the ball and a chemiluminescent light stick is activated and inserted in the duct, shaft or passage. In another configuration, a translucent Wiffle® ball has a chemiluminescent light stick which has been inserted through a port in the Wiffle® ball. The ends of the light stick are joined and the length of the light stick is such as to fit snugly within the Wiffle® ball. In a further configuration, a toy ball is formed of a single, thin skin of light passing material and has at least one flap in the skin surface which permits insertion and removal of a chemiluminescent light source and is closeable after the light source has been inserted.

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25

In another type of illuminated game ball, the ball has portions of reduced thickness to provide transparent or translucent patterns separated by increased thickness to provide opaque portions. The interior of the ball is occupied by a breakable liquid illumination device (chemiluminescent light stick) held in a removable housing of transparent or translucent material for conveying illumination from the device to the selected portions of the ball thereby transmitting the illumination exteriorly of the ball for visual observation.

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Also disclosed is a harness for attachment to a football, volleyball, basketball or the like. A portion of the harness is formed of elongate portions of translucent or transparent tubing sections and chemiluminescent light sticks are inserted into the tubing after activation.

5        Additionally disclosed is an illuminated sports ball having flexible transparent tubing on its exterior for housing and exposing flexible light sources. The tubing is recessed in grooves around the ball so that only a portion thereof projects outward from the exterior surface of the ball. In one embodiment, the grooves terminate at common points on the ball and a central throughbore extends  
10        through the ball between these common points. An anchor chord which extends through a bore within the ball may be attached to the ends of the tubes to secure the tubes in the grooves. The tubes may extend within the ball to attach to the anchor cord, or the other tubes positioned around the ball. The light sources are  
15        chemiluminescent light sticks which are inserted into the tubes through a central slot. The slot desirably faces the grooves during use and the tubes are torsionally flexible and can be rotated to face outward for inserting the light sticks. The grooves may extend in direct or non-linear paths around the exterior periphery of the ball.

## 20        SUMMARY OF THE INVENTION

      The present invention, in one aspect, provides an illuminated game ball or balloon comprising a game ball or balloon having means for holding thereon at least one chemiluminescent light stick proximate the surface of thereof. The means for holding the chemiluminescent light stick proximate the surface of the game ball can  
25        be, for example, a loop, a tab, or a groove. The means for holding the chemiluminescent light stick proximate the surface of the balloon can be, for example, a loop.

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### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a segmented inflatable game ball having chemiluminescent light sticks proximate to the surface thereof of the present invention.

FIG. 2 is a bottom view of the segmented inflatable game ball having chemiluminescent light sticks proximate to the surface thereof of FIG. 1.

FIG. 3 is a cross-sectional inverted view of the segmented inflatable game ball of FIG. 2 taken along line 3-3.

FIG. 4 is a fragmented cross-sectional view of the segmented inflatable game ball of FIG. 1 taken along line 4-4.

FIG. 5 is a side view of a self-supporting hollow game ball having chemiluminescent light sticks proximate to the surface thereof of the present invention.

FIG. 6 is a side view of a self-supporting solid game ball having a chemiluminescent light stick press-fit into a groove therein of the present invention.

FIG. 7 is a cross-sectional view of the self-supporting game ball of FIG. 6 taken along line 7-7 showing the chemiluminescent light stick press-fit into the groove.

FIG. 8 is a partial cross-sectional view of a self-supporting solid game ball having a chemiluminescent light stick resting in a groove therein and being held by a tab.

FIG. 9 is a partial cross-sectional view of a self-supporting solid game ball having a chemiluminescent light stick resting in a groove therein and being held by an alternative type of tab.

FIG. 10 is a perspective exploded view of a solid segmented game ball useful in the present invention.

FIG. 11 is a side view of an alternative embodiment of a solid game ball having a chemiluminescent light stick proximate to the surface thereof.

FIG. 12 is a side view of another alternative embodiment of a solid game ball having a chemiluminescent light stick proximate to the surface thereof.

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FIG. 13 is a partial cross-sectional view of a self-supporting solid game ball having a chemiluminescent light stick resting in a groove therein and being held by joining the terminal portions of the chemiluminescent light stick.

FIG. 14 is a balloon of the invention having a chemiluminescent light stick  
5 held proximate the surface thereof of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

The game balls of the invention may be inflatable or self-supporting, either  
10 solid or hollow and may be of unitary or segmented construction. If the game ball is inflatable or of a hollow self-supporting structure, the entire game ball or portions thereof may be transparent or translucent. The balloons of the invention which are, of course, inflatable can also be of unitary or segmented construction and can be opaque, translucent or transparent. Of course, whether the game balls are  
15 transparent, translucent, opaque or a combination thereof, any or all portions can be provided with color and/or designs.

Inflatable game balls and balloons of the invention are preferably fabricated of flexible material such as, but not limited to, polyvinyl chloride, polyethylene, polypropylene, synthetic rubber, or Mylar™. An inflatable game ball or balloon is  
20 provided with a suitable valve of the type such as, for example, those used in conventional inflatable balls and inserted in a similar manner. Such valves may provide for inflation by use of a pump or by mouth. The balloons of the invention may be filled with helium to cause them to float.

Inflatable game balls and balloons may be of a unitary or segmented  
25 construction. When a single unit of material is used, the game ball may be transparent, translucent or opaque. When the game ball or balloon is formed of segments of material the segments may be the same or different and can be transparent, translucent or opaque. Preferably, at least portions of the game ball or balloon is transparent or translucent for aesthetic purposes. When the game ball or  
30 balloon is formed of segments, the number of segments can be in the range of two to about ten or more depending on the size and shape of the ball or balloon, with a

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greater number of segments being more easily fabricated into larger balls and balloons.

Hollow self-supporting game balls of the present invention can be fabricated of any material which at a given thickness is sufficiently inflexible to provide the self-supporting characteristic. Such materials include, but are not limited to, natural and synthetic rubbers, polyethylene, polyester, polyvinyl chloride, and other plastic materials or metal, such as, for example, aluminum.

As with the inflatable game balls, hollow self-supporting game balls may be of a unitary or segmented construction. When a single unit of material is used, the game ball may be transparent, translucent or opaque. When the game ball is formed of segments of material the segments may be the same or different and can be transparent, translucent or opaque. Preferably, at least portions of the game ball is transparent or translucent for aesthetic purposes. When the game ball is formed of segments, the number of segments can be in the range of two to about ten or more depending on the size and shape of the ball, with a greater number of segments being more easily fabricated into larger balls.

When either the inflatable or hollow self-supporting game balls are formed of two or more segments, the segments can be joined by conventional methods such as, for example, heat sealing, laser welding or by the use of adhesives.

Solid self-supporting game balls of the invention can be prepared from various materials including, for example, natural or synthetic rubber, various plastic materials, foam materials, fabric-covered solid materials, or wood. The solid self-supporting game balls may be of a unitary construction or to achieve a desired aesthetic effect, the solid self-supporting game balls may also be formed of two or more segments. Again, the segments may be joined by conventional means such as by adhesive, double-coated pressure-sensitive adhesive tape or adhesive-coated hook and loop fasteners. Where adhesive-coated hook and loop fasteners are used, the adhesive sides of the fasteners are permanently adhered to the solid segments and the hook and loop portions adhere sufficiently while the game ball is in use to maintain the integrity of the ball, but can allow the segments to be rearranged to

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change the aesthetics of the game ball. Generally, the outer portions of the game ball would substantially remain as outer portions even after rearrangement.

The illuminated game balls of the present invention can be formed with a substantially uniform surface or the surface can be provided with grooves.

5 Generally, the balloons of the invention are not formed with grooves. Where the surface is substantially uniform, the preferred method of attachment of the chemiluminescent light stick(s) is by the use of intermittently spaced loops. The loops may be formed as part of the ball or balloon, for example, when the ball or balloon is formed of segments, the loops may be held within the seams of the ball or  
10 balloon. Alternatively, loops may be attached to the surface of the ball by well-known techniques, such as, for example, by adhesive, double-faced pressure-sensitive adhesive tape and the like.

The loops may be formed of material similar to or different than that of the game ball or balloon. The loops can be formed, for example, of plastics,  
15 elastomeric materials, fabric, metal such as aluminum, and the like.

The loops may be of unitary construction or may be formed in two parts which can be joined by known means such as, for example, hook and loop fasteners such as Velcro™. The number of loops required to hold the chemiluminescent light stick(s) proximate to the surface of the game ball or balloon depends on the size of  
20 the game ball or balloon, the number of chemiluminescent light sticks to be held proximate to the surface, and the size of the game ball or balloon. Generally, at least two loops are required and with some configurations several loops may be needed for each chemiluminescent light stick. The total number of loops required can readily be determined by those skilled in the art.

25 The diameter of the loops is determined by the diameter of the chemiluminescent light stick(s). Preferably, when the loops are formed of non-elastic material, the loops are slightly larger in diameter, for example, about five to about ten percent larger in diameter, than the chemiluminescent light stick(s) for ease of insertion of the chemiluminescent light stick(s). If the loops are too small in  
30 diameter, difficulty will be encountered in inserting the chemiluminescent light stick(s); if the loops are too large in diameter, the light sticks may not be sufficiently

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held proximate the surface of the game ball or balloon. Where the loops are formed of elastomeric materials; the loops may be somewhat smaller than the chemiluminescent light stick(s), but must be of sufficient diameter to allow stretching of the loops sufficient to permit insertion of the chemiluminescent light stick(s).

The width of the loops can vary widely, for example, from about 1 to 2 millimeters (about 0.04 to 0.08 in.) up to about 1 cm (0.4 in.) or more. The loop should be of sufficient width to securely hold the chemiluminescent light stick(s) proximate the surface of the game ball or balloon. However, particularly where the loop is of opaque material, the loop should not be so wide as to detrimentally affect the aesthetics of the chemiluminescent light stick(s). The appropriate width can readily be determined by a practitioner of the art depending on the number of loops used and the material from which the loops are formed.

When the surface of the game ball is provided with one or more grooves, tabs may be required to hold the chemiluminescent light stick(s) proximate the surface. Where the groove is such that the chemiluminescent light stick(s) merely rest within the groove, tabs are preferably provided perpendicular to the groove to cross the surface of the groove to hold the chemiluminescent light stick(s) proximate the surface. The tabs should be of sufficient length that they may be securely attached to the surface of the game ball. The tabs may be attached to the surface of the game ball adjacent the groove by well-known means such as adhesives, double-coated pressure-sensitive adhesive tapes, or hook and loop fasteners such as Velcro™.

The tabs may be formed of material similar to or different than that of the game ball or balloon. The tabs can be formed, for example, of plastics, elastomer materials, fabric, wood, metal such as aluminum, and the like.

As with the loops, the width of the tabs can vary widely, for example, from about 1 to 2 millimeters (about 0.04 to 0.08 in.) up to about 1 cm (0.4 in.) or more. The tab should be of sufficient width to securely hold the chemiluminescent light stick(s) in the groove game ball. However, particularly where the tab is of opaque material, the tab should not be so wide as to detrimentally affect the aesthetics of

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the chemiluminescent light stick(s). The appropriate width can readily be determined by a practitioner of the art depending on the number of tabs used and the material from which the tabs are formed.

5 In some cases, with solid game balls neither loops nor tabs are required to hold the chemiluminescent light stick(s) proximate to the game ball. In such cases, the chemiluminescent light stick(s) are in contact with the surface of the game ball. Where the solid game ball is formed of a somewhat conformable material such as, for example, foam rubber, the chemiluminescent light stick(s) may be press-fit into a groove formed on the surface of the game ball.

10 In other cases, where the game ball is of a non-conformable, or substantially hard surface such as wood, the chemiluminescent light stick(s) may reside in a groove having a depth substantially the same as or slightly greater than the diameter of the chemiluminescent light stick(s) and be of such length that when the ends are joined the chemiluminescent light stick(s) do not extend beyond the greater outer  
15 surface of the game ball. Such constructions are particularly useful where the game ball may be subject to various forms of striking forces.

The game balls and balloons of the invention may be of any size. Preferably, the game balls and balloons are at least about 5 cm (2 in.) along a major axis and can be as large as 1 m (40 in.) or more along a major axis. More preferably, the  
20 size of the game ball is similar to that of well-known game balls such as, for example, beach balls, baseballs, basketballs, volleyballs, footballs, billiard balls and the like. Balloons may also be in such shapes as round, heart-shaped, star-shaped, flower-shaped, as well as in various seasonal shapes as pumpkins, Christmas trees, and figures such as Santa Claus.

25 The chemiluminescent light sticks useful in the present invention are known devices. Typically, such devices incorporate chemical components which react to provide excitation for a fluorescent compound. Once the reaction is initiated, it runs its course and the light will extinguish when the reaction is complete, generally a matter of hours. One such type of chemiluminescent light device has an outer  
30 flexible tube of translucent material having concentrically disposed therein an inner rigid tube, the rigid tube being breakable. The sealed inner tube is filled with one

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component of a two-component chemical lighting system, and the sealed outer tube is filled the second component. To activate the device, the flexible outer tube is bent to an extent the inner tube fractures causing the two components to intermingle to initiate the generation of light. The chemiluminescent light stick may be replaced after the light diminishes during use or may be replaced before subsequent use when the light self-extinguishes after use. The chemiluminescent light sticks may be provided with terminal segments by which one end of the light stick may be joined to the other end of the light stick or the ends of the light stick may be joined together.

The present invention will now be further described with respect to the drawings which should not be construed to unduly limit this invention

FIGs. 1, 2, 3 and 4 are various views of segmented inflatable game ball 10 having transparent segments 12 and opaque segments 14. Circular portions 16a, 16b, shown as being opaque, are present for ease of construction and is joined to the other segments by seam 15. Into seams 17 between the segments are situated loops 18 which protrude from the game ball surface 19. The seams and loop securing means may be formed by adhesive bonding or heat welding. Chemiluminescent light sticks 20 slide through loops 18 and thereby are held proximate to surface 19 of ball 10. In this embodiment, two chemiluminescent light sticks are used with end-to-end attachment at joints 22. Valve 24, a typical type of inflation valve used in game balls, is located in circular portion 16a and can be used both for purposes of inflation and deflation.

FIG. 5 shows a side view of hollow self-supporting ball 30 having loops 32 attached at portion 34 of the loops to the surface thereof by such means as adhesive. Chemiluminescent light sticks 36 have been inserted through loops 32 proximate surface 37 of ball 30 such that they are joined at joints 38 to encircle ball 30.

FIGs. 6 and 7 show solid self-supporting foam game ball 40 having groove 42 formed in the surface 44 of the somewhat flexible foam. The foam is sufficiently flexible that chemiluminescent light stick 46 can be press-fit into groove 42 for use and, then, removed subsequent to use without damage to the ball.

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FIG. 8 and 9 show alternative embodiments of insertion of chemiluminescent light stick 52 in grooves 54 of solid self-supporting game balls. In these embodiments, the groove is not designed for press-fit of the chemiluminescent light sticks as shown in FIG. 7, but the chemiluminescent light sticks merely reside in grooves 54. In FIG. 8, the chemiluminescent light stick is held in place by two-part tab 58, end portions 59 of which are attached to surface 56 of the game ball by means such as adhesive. The ends of the tab not attached to the surface releasably adhere to each other at joining area 60 by means of a hook and loop fastening device such as Velcro™. In FIG. 9, one-part tab 62 is adhered to surface 56 at end portions 64, such that chemiluminescent light stick 52 may be slid into the groove beneath the tab during use.

FIG. 10 shows segmented solid self-supporting game ball 70 of the present invention. Segments 72 are removably attached by means of hook and loop fastening device 74a, 74b, and can be rearranged as desired. Rearrangement is particularly encouraged when the segments are of different colors and can be rearranged to achieve differing aesthetic effects. Loops 73 are adhered to the surface of a segment by means such as adhesive and chemiluminescent light stick 75 is slidably inserted in the tabs proximate the surface of the ball.

FIG. 11 shows softball or baseball 80 having chemiluminescent light stick 82 encircling the ball. Chemiluminescent light stick 82 resides in a groove in the ball (not visible) such that it does not protrude beyond the major surface of ball 80 and is held in place by joined ends (not shown).

FIG. 12 shows billiard ball 78 having chemiluminescent light stick 79 encircling the ball. Chemiluminescent light stick 79 resides in a groove in the ball (not visible) such that it does not protrude beyond the major surface of ball 78 and is held in place by joined ends (not shown).

FIG. 13 shows a partial cross-section of a wooden ball similar to that shown in FIG. 12 with chemiluminescent light stick 84 residing in groove 86 proximate surface 88.

FIG. 14 shows a front view of balloon 90. In this configuration, segmented inflatable heart-shaped balloon of a material such as Mylar™ has loops 92 welded in

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the seam 93 between the segments, front and back. Chemiluminescent light sticks 94 are held proximate the surface of the heart-shaped form by loops 92.

Various modifications and alterations of this invention will become apparent to those skilled in the art without departing from the scope and spirit of this invention, and it should be understood that this invention is not to be unduly limited to the illustrative embodiments set forth herein.

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What is claimed is:

1. An illuminated game ball or balloon comprising a game ball or balloon  
having means for holding thereon at least one chemiluminescent light stick  
5 proximate the surface of thereof.
2. The illuminated game ball of claim 1 wherein said means for holding said  
at least one chemiluminescent light stick proximate said surface of said game ball is  
at least one loop, tab or groove.  
10
3. The illuminated game ball of claim 1 wherein said game ball is inflatable,  
a self-supporting hollow structure or a self-supporting solid structure.
4. The illuminated game ball of claim 1 wherein said game ball is of unitary  
15 or segmented construction, said segments being joined by seams.
5. The illuminated game ball of claim 3 wherein said game ball is inflatable  
or a self-supporting hollow structure and is transparent, translucent, or opaque.
- 20 6. The illuminated game ball of claim 5 wherein at least portions of said  
segmented game ball are transparent or translucent.
7. The illuminated game ball of claim 3 wherein said inflatable game ball  
comprises a flexible material.  
25
8. The illuminated game ball of claim 7 wherein said flexible material is  
polyvinyl chloride, polyethylene, polypropylene, synthetic rubber, Mylar™ or a  
combination thereof.
- 30 9. The illuminated game ball of claim 3 is inflatable and further comprises a  
valve for inflation and deflation.

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10. The illuminated balloon of claim 1 wherein said means for holding said at least one chemiluminescent light stick proximate said surface of said balloon is at least one loop.

5 11. The illuminated game ball of claim 1 wherein said at least one chemiluminescent light stick is held proximate the surface of said game ball by at least two loops.

10 12. The illuminated game ball of claim 3 wherein said game ball is segmented, said segments being joined by seams, and said at least one chemiluminescent light stick is held proximate the surface thereof by two or more loops secured in the seams between said segments.

15 13. The illuminated game ball of claim 3 wherein said game ball has said at least one chemiluminescent light stick held proximate said surface thereof by two or more loops adhered at the terminal portions thereof to said surface.

20 14. The illuminated game ball of claim 3 wherein said self-supporting game ball is of foam and said at least one chemiluminescent light stick is held proximate said solid game ball by a groove into which said at least one chemiluminescent light stick is removably press-fit into said groove.

25 15. The illuminated game ball of claim 3 wherein said self-supporting game ball is of foam and said at least one chemiluminescent light stick is held proximate said solid game ball by a groove over which at least two intermittently spaced tabs are adhered.

30 16. The illuminated game ball of claim 3 wherein said self-supporting game ball has said at least one chemiluminescent light stick held proximate said solid game ball by a groove into which said at least one chemiluminescent light stick resides, the surface of said chemiluminescent light stick(s) being below the major

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surface of said game ball and the terminal portions of said chemiluminescent light stick(s) being joined by seams.

17. The illuminated balloon of claim 1 wherein said balloon is of unitary or segmented construction, said segments being joined at seams.

18. The illuminated balloon of claim 17 wherein said balloon is transparent, translucent or opaque.

19. The illuminated balloon of claim 17 wherein said balloon is of segmented construction and at least a portion thereof is translucent or transparent.

20. The illuminated balloon of claim 1 wherein said balloon comprises polyvinyl chloride, polyethylene, polypropylene, synthetic rubber, Mylar™ or a combination thereof.

21. The illuminated balloon of claim 1 has an opening or valve for inflation and deflation.

22. The illuminated balloon of claim 21 wherein said balloon is inflated with helium.

23. The illuminated balloon of claim 17 wherein said at least one chemiluminescent light stick is held proximate said surface of said balloon by at least one loop.

24. The illuminated balloon of claim 17 wherein said segmented balloon has at least two loops to provide means for holding said at least one chemiluminescent light stick proximate said surface of said balloon.

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25. The illuminated balloon of claim 24 wherein said loops are secured in the seams between the segments or are adhered to said surface of said balloon at the terminal portions of said loops.

5 26. The illuminated game ball or balloon of claim 1 wherein at least a portion thereof is provided with color or a design.

27. The illuminated game ball or balloon of claim 1 wherein said game ball or balloon is at least about 5 cm. in length along a major axis.

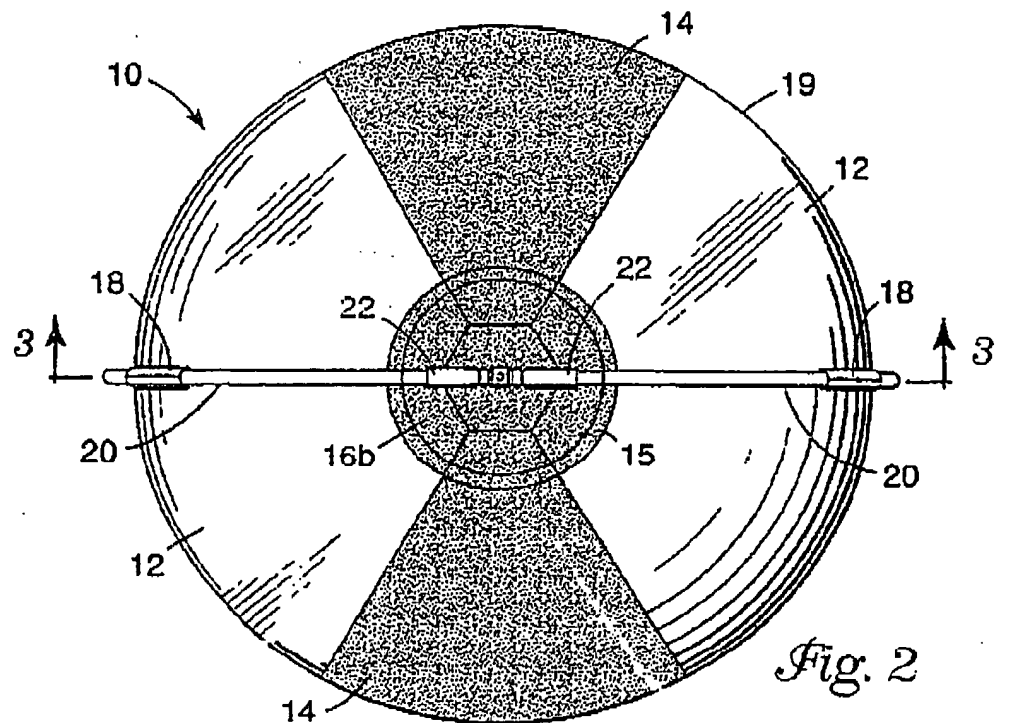
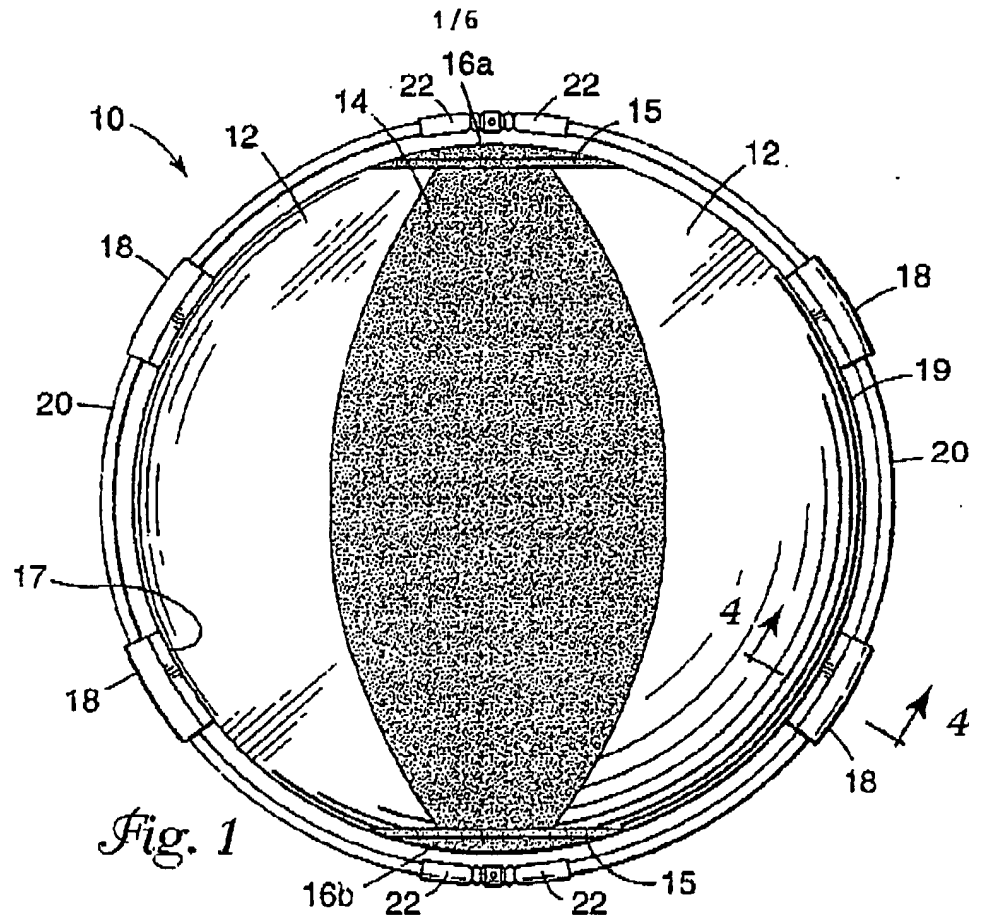
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28. The illuminated game ball of claim 1 wherein said game has the form of a beach ball, baseball, basketball, volleyball, football or billiard ball.

15 29. The illuminated balloon of claim 1 wherein said balloon has a round shape or the shape of a heart, star, flower, pumpkin, Christmas tree or Santa Claus.

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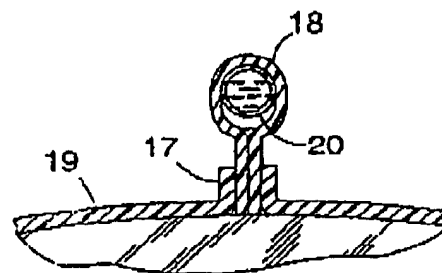
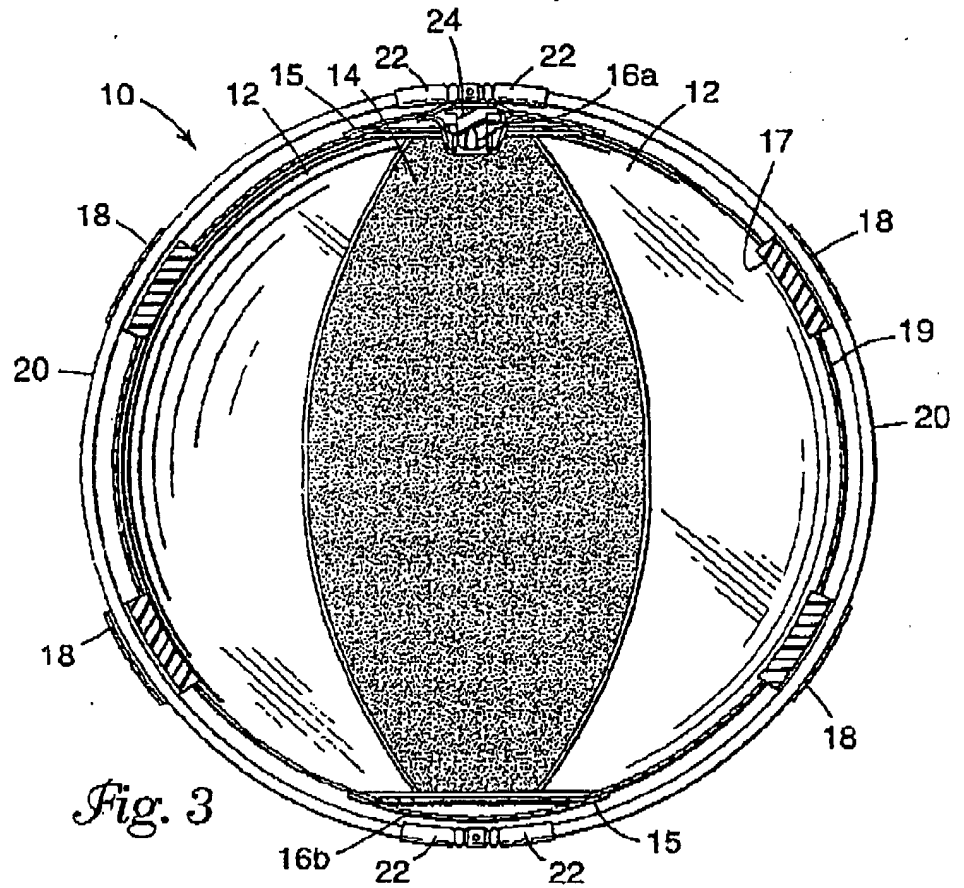
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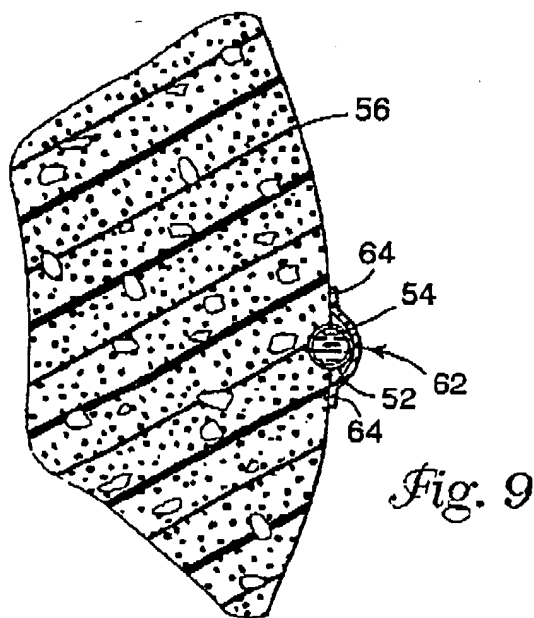
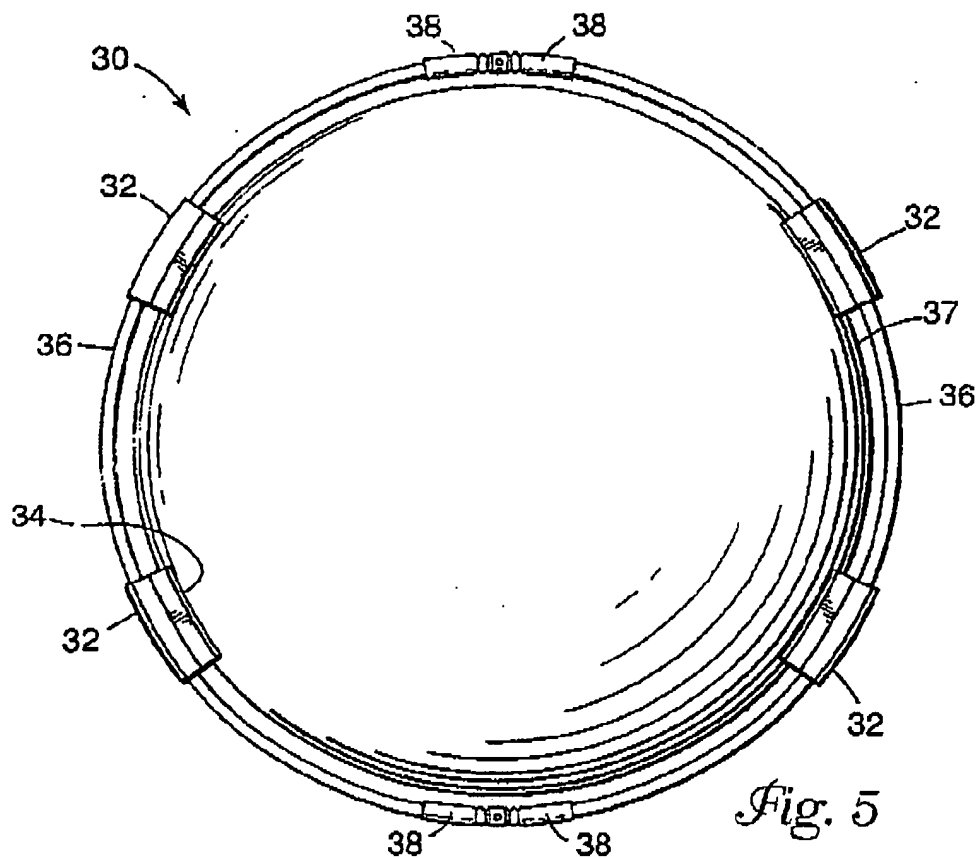
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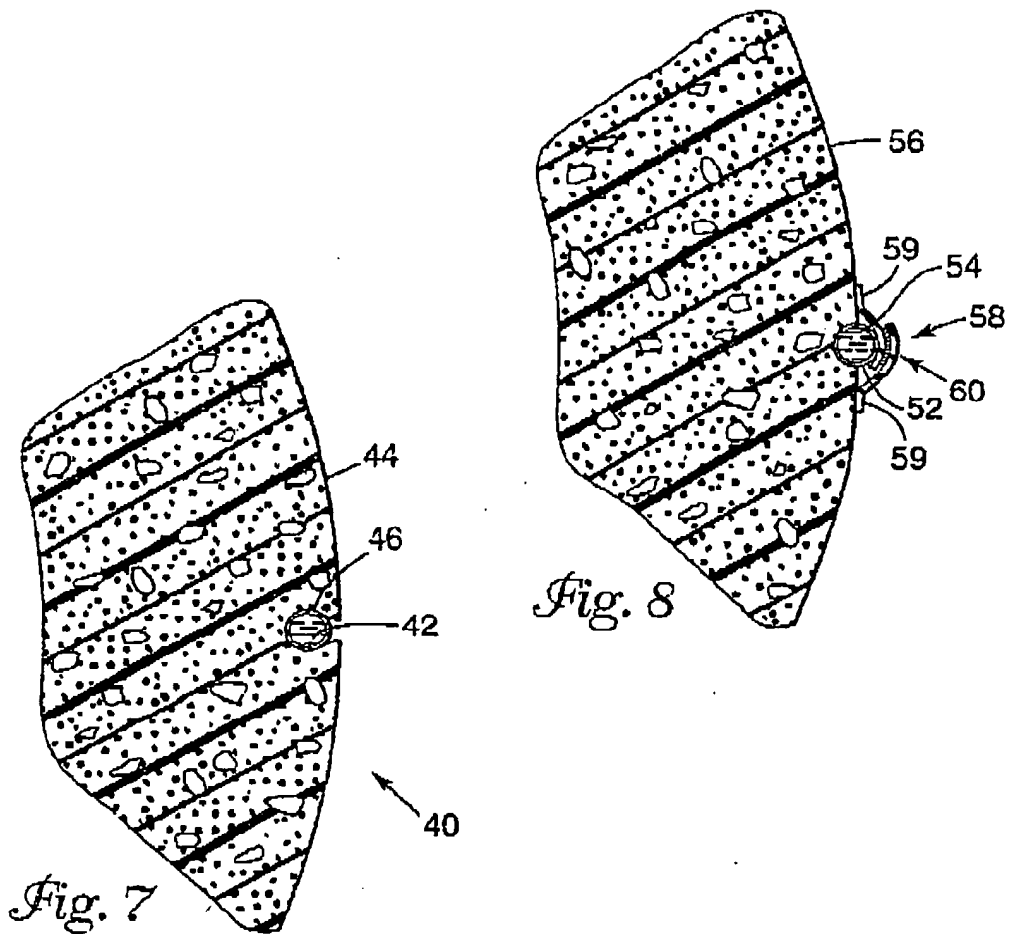
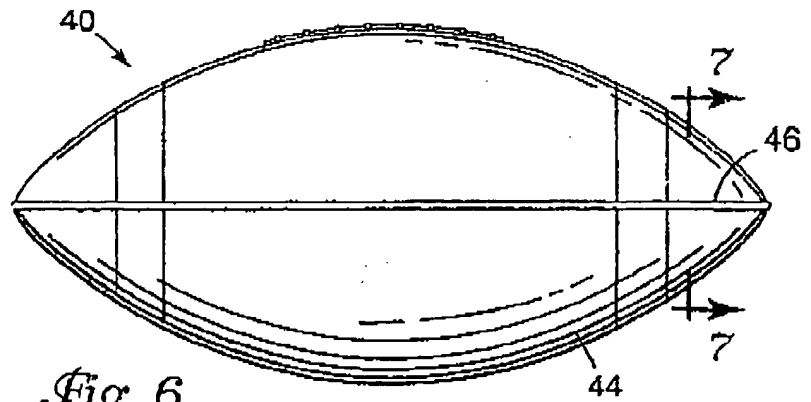
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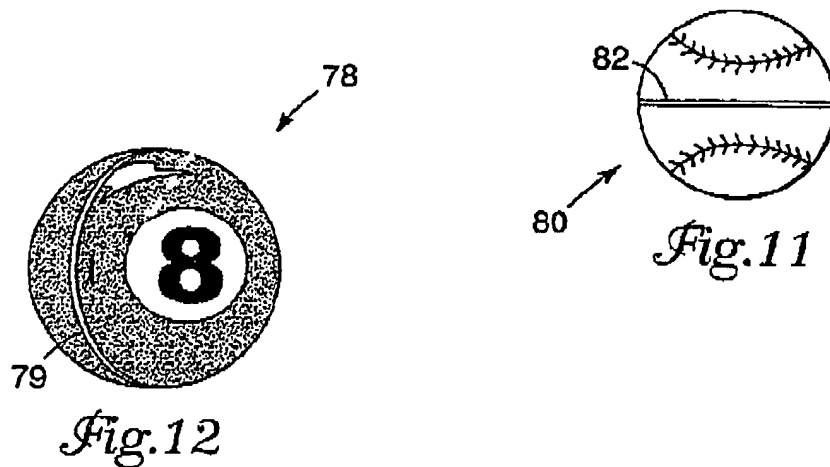
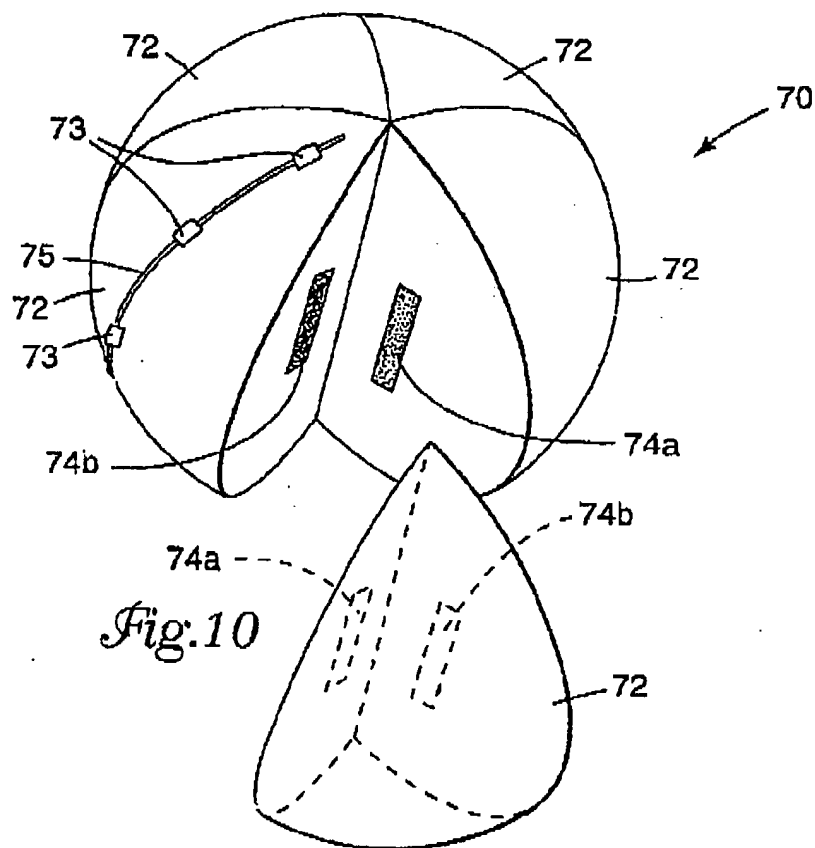
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